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(51) INT CL^6
H01H 3/12

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U1S S2123

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(58) Field of Search
UK CL (Edition O) **H1N**
INT CL^6 **H01H**

(54) **Keyboard switch**

(57) A keyboard switch comprises first and second movable elements (20,30) engaged with each other and connected between a keycap (12) and a keyseat (11). The first and second elements (20,30) are provided with interengageable pressing boards (25,34), and interengageable slots (24) and shafts (33). When the keycap (12) is pressed at any position thereof, the keycap (12) will move downwardly in a well balanced and stable manner. When the key cap (12) is released, it will return to its original position as a result of an elastic rubber pad mounted within the keyseat (11).

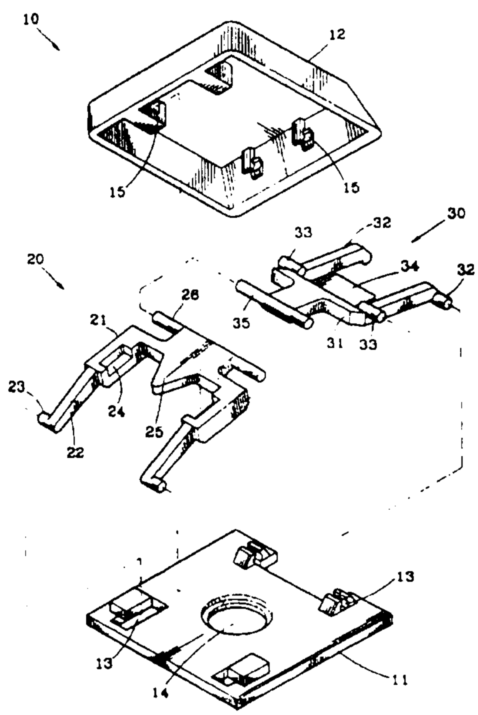

FIG.1

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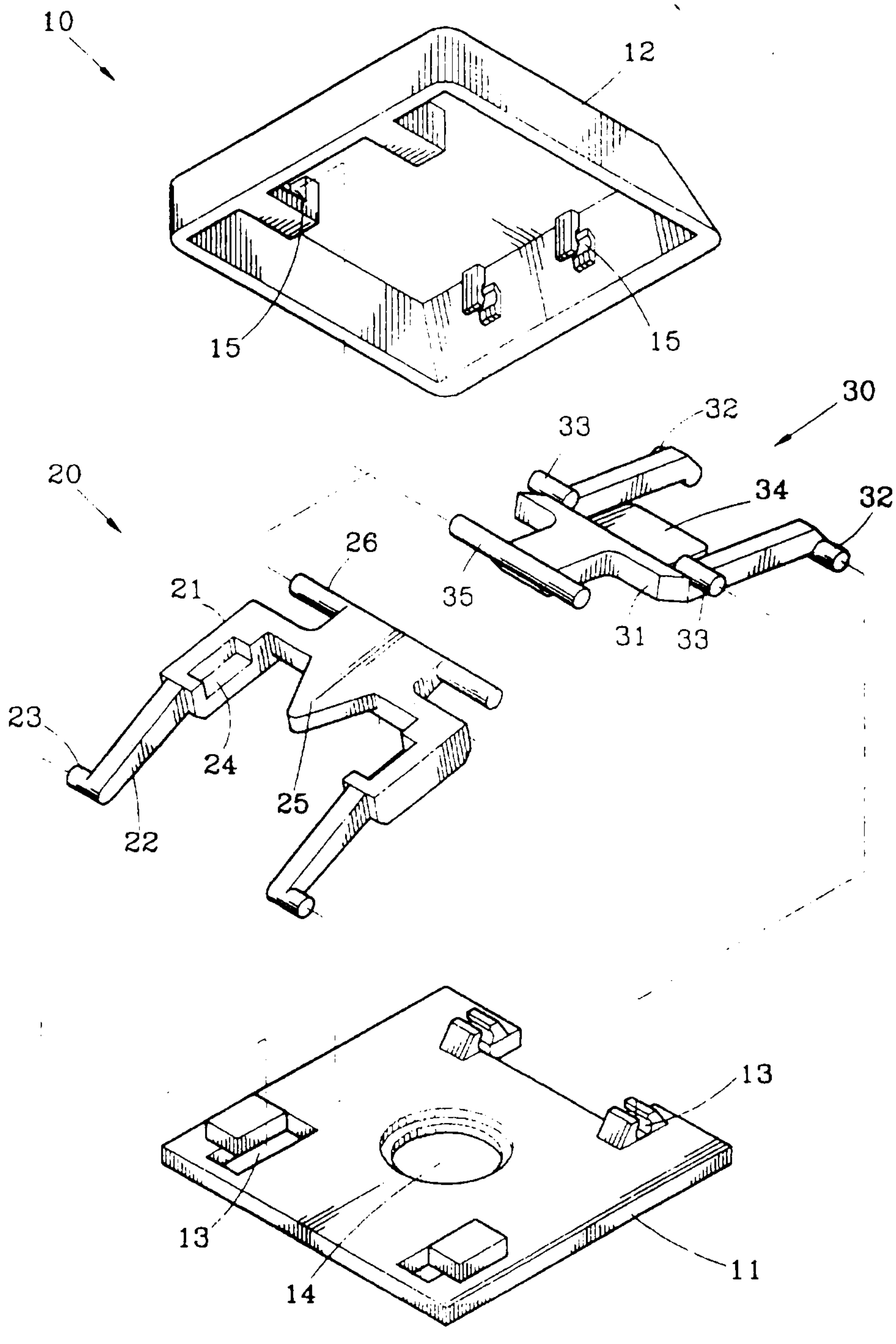


FIG.1

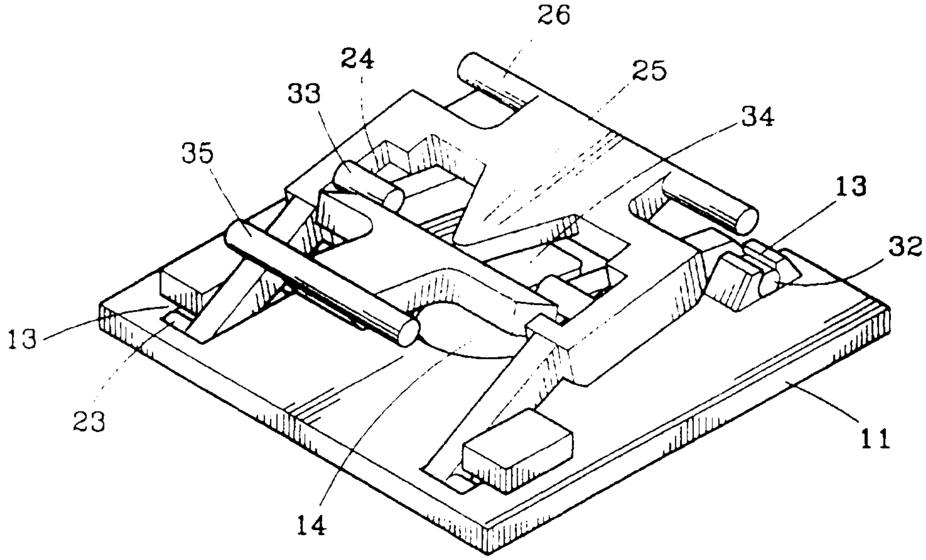


FIG.2

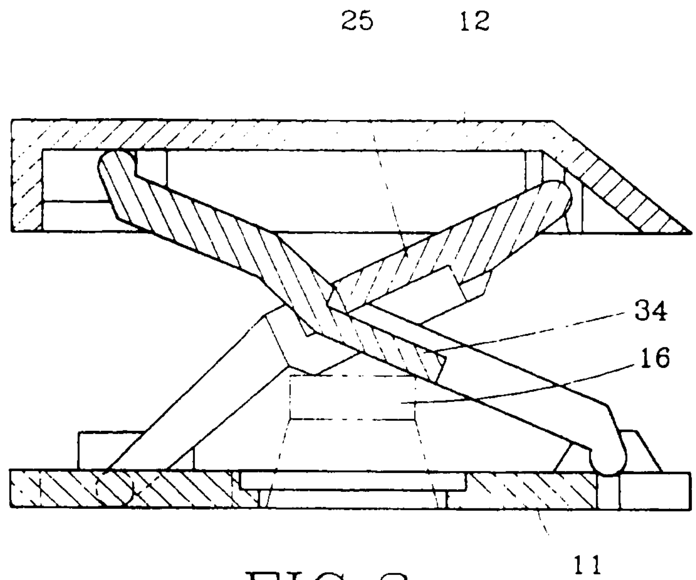


FIG.3

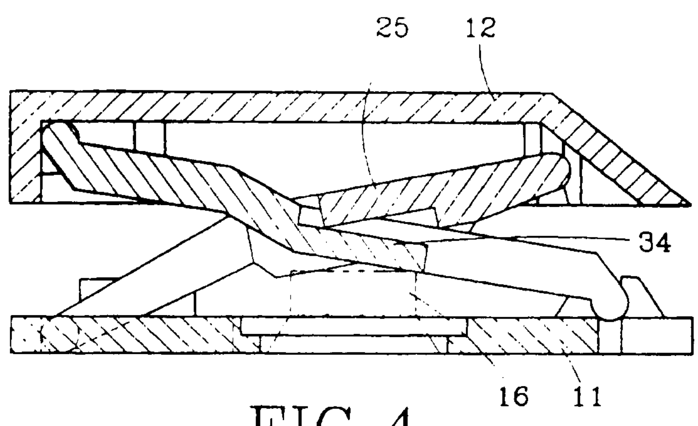


FIG.4

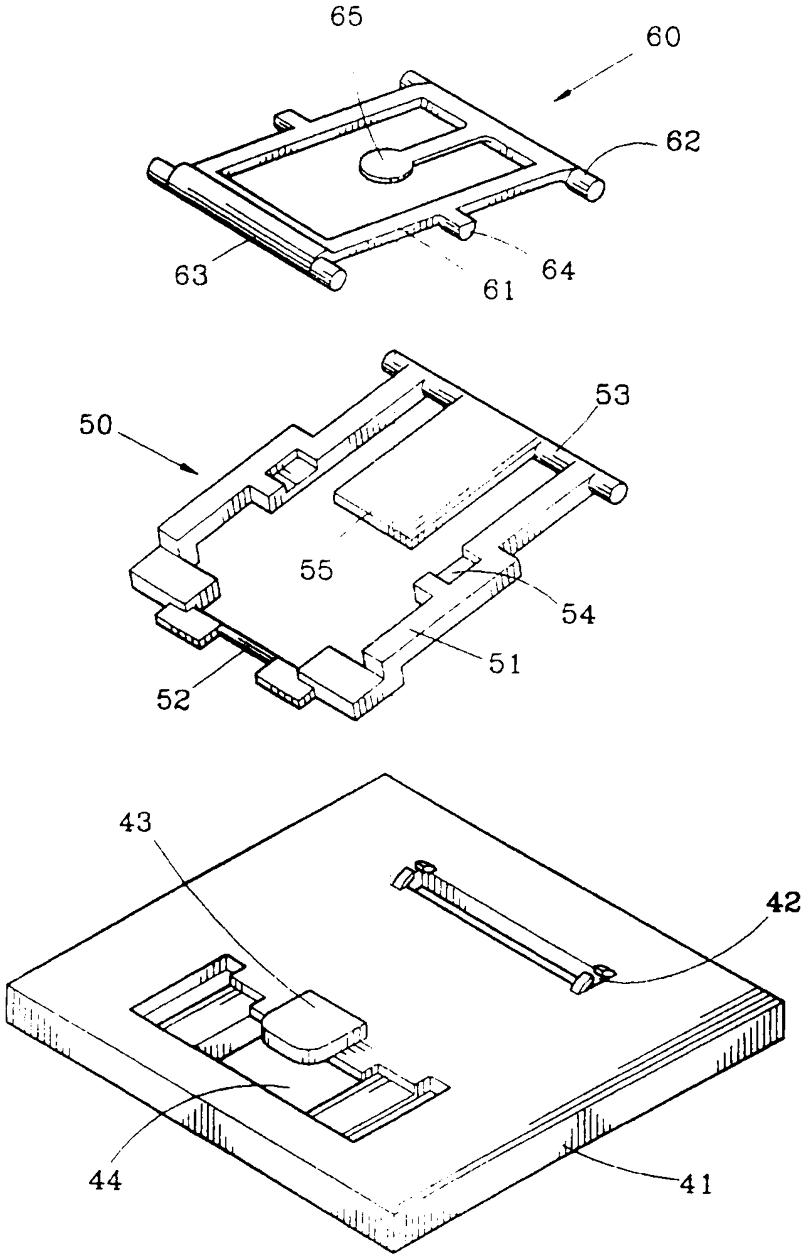
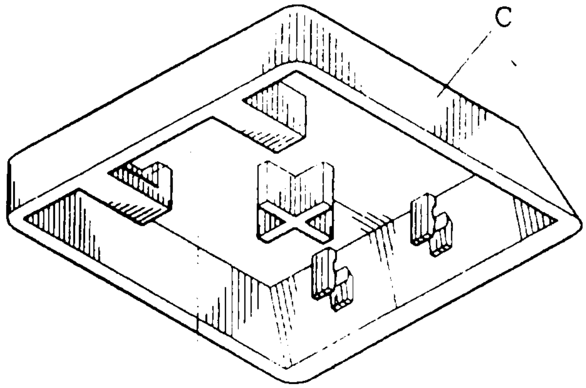


FIG.5



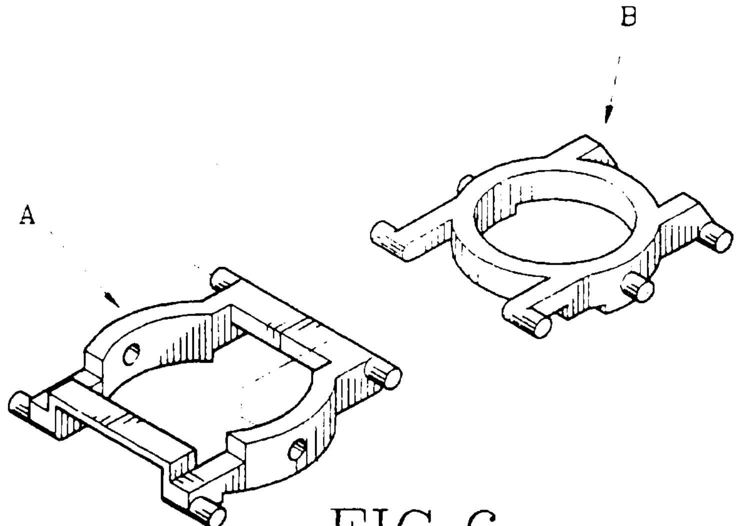


FIG.6

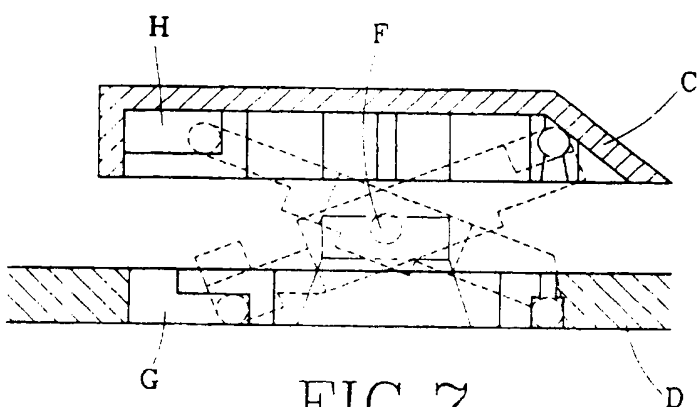


FIG.7

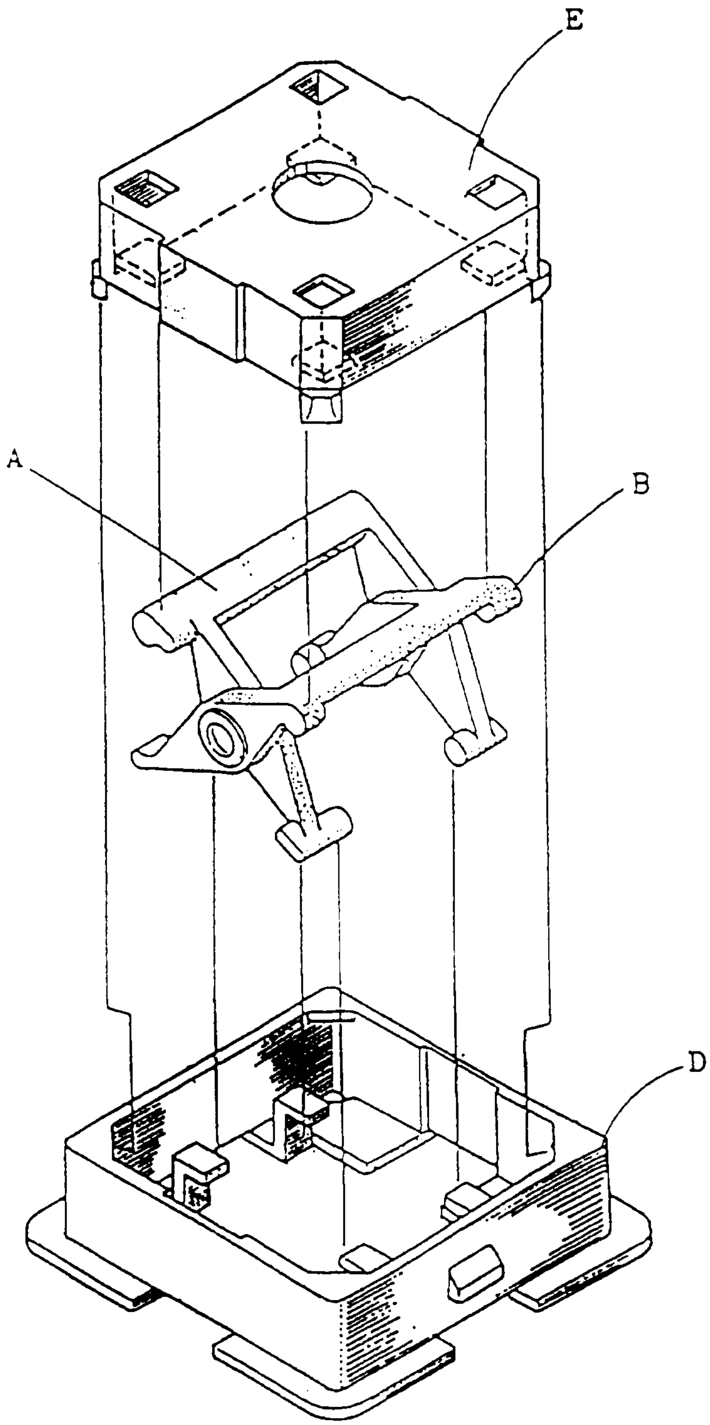


FIG-8

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KEYBOARD SWITCH

The present invention relates to a keyboard switch, in particular, to a switch having corresponding pressing board to trigger the protruded shaft of the first element and the slot of the second element. These two elements are alternately engaged and located in between a keyseat and a keycap. The keyboard switch provides a stable and balanced downward movement of the keycap.

Conventional type of keyboard switch has a cylindrical rod extended from the inner edge of the keycap to retractably trigger the electrical contact. Due to the restriction of the structure, if the contact surface between the bottom seat and the cylindrical rod is small, the cap may easily incline and the key may not be stable. As a result, a bigger contact surface is needed to balance the keycap. However, a thinner and smaller size computer is more and more needed for the users. Increasing the contact surface and the distance of the movement of the keycap will be affect the thickness of the keyboard. This will not comply with the requirements of a small size computer. Besides, the stability of the downward movement may not be improved. As a result, it is imperative to improve the structure of the keyboard switch by shortening the downward movement of the keycap.

In another prior art, at the bottom end of the keycap, an alternate supporting frame is used to support the cap in order to provide a smaller and shorter downward movement of the keycap. For instance, as shown in Figs. 6 and 7, in which a pair of frames A and B are used to support in between the cap C and seat D. Frames A and B are interconnected at a pivot F. A gap H is provided in the cap C and a gap G is provided in the seat D for the sliding of the ends of the frames A and B when the frames A and B move. When the cap C is pressed downward, the downward distance of the cap C to the electrical contact at the bottom thereof is shortened. However, in this prior art, if the cap is pressed at different position thereof, the cap may be inclined and caused a biased downward movement of the cap. Thus, the electrical contact of the key may be poor.

In a further prior art which is shown in Fig. 8, a pair of square frames A and B are pivoted and located at key seat D. At the top of the frame, a slide key E is mounted. This slide key E is used for supporting the keycap. Thus, a switch is obtained. In this prior art, the slide key E is used to stabilize the sliding movement. However, as a result of the structure of the frames A and B, an imbalance downward movement is occurred if the

keycap is pressed at the side or the corner of the keycap. Thus, the electrical contact of the key is poor.

It would be desirable to be able to provide an improved keyboard switch, wherein first and second elements are alternatively engaged with each other and each element has a corresponding pressing plate to actuate with each other, so that a stable and balanced downward movement of the keycap is provided.

It would also be desirable to be able to provide an improved keyboard switch, wherein the stable and balance downward movement of the keycap will trigger the electrical contact of the key switch and avoid poor electrical contact of the key switch.

For best understanding of the nature of the present invention, the attached drawings show a preferred embodiment as an illustrative and nonlimitative example, to which drawings the description refers.

Fig. 1 is a perspective exploded view of the keyboard switch in accordance with the present invention;

Fig. 2 is a perspective view of the present invention;

Fig. 3 is a cross-sectional view of the keyboard switch before the keycap is pressed downward;

Fig. 4 is a cross-sectional view of the keyboard switch after the keycap is pressed downward and the elastic rubber pad triggers the electrical contact;

Fig. 5 is a perspective exploded view of a further preferred embodiment in accordance with the present invention;

Fig. 6 is a perspective view of a keyboard switch in prior art;

Fig. 7 is a cross-sectional view of Fig. 6; and

Fig. 8 is an exploded view of another keyboard switch in prior art.

As shown in Fig. 1 , the keyboard switch 10 of the present invention comprises a first element 20 and a second element 30 alternately engaged and located onto a keyboard seat 11, a keycap 12 being supported at the top of the first and second

elements 20, 30.

The keyseat 11 comprises fastening slots 13 at the four corner of the seat 11 for the engagement of the pivoted shaft 23 of the first element 20 and the pivoted shaft 33 of the second element 30. At the center of the keyseat 11, a slot 14 is provided for the position of an elastic rubber pad 16 (as shown in Figs. 3 and 4) of the electrical contact.

The keycap 12 comprises fastening slots 15 provided substantially at the inner edge of the four corners of cap 12 for the engagement of the horizontal shaft 26 of the first element 20 and the horizontal shaft 35 of the second element 30. When the first element 20 and the second element 30 are in engagement with the fastening slots 15 and fastening slots 13, a stable and balanced movement of the elements 20, 30 is obtained (as shown in Fig. 2). Such structure will rigidly support the cap 12 at the top end thereof.

The first element 20 comprises a substantially open C-shaped body 21. The body 21 has two open ends with two protruded extensions 22. At the end of the extension 22, a pivoted pad 23 is provided for the engagement with a fastening slot 13 of the seat 11. At the inner edge of the ends of the body 21, a recess 24 is provided for receiving the protruded shaft 33 of the second element 30. At the inner edge of the body 21, a conical shaped pressing board 25 is provided, which corresponds to a pressing board 34 of the second element 30. A horizontal shaft 26 is provided at the center section of the external edge of the body 21 for the engagement with the fastening slot 15 of the cap 12.

The structure of the second element 30 is substantially similar to the first element 20. The second element 30 comprises a substantial open C-shaped body 31. The body 31 has two open ends with two pivoted ends 32 for the engagement with the fastening slot 13 of the seat 11. At the inner edge of the body 31, protruded shafts 33 overlie the two slots 24 of the first element 20. At the center region of the inner edge, a pressing board 34 is provided corresponding to the pressing board 25 of the first element 20. At the external edge of the body 31, a horizontal shaft 35 is provided for engagement with the fastening slot 15 of the cap 12.

The width of the second element 30 is smaller than that of the first element 20. In combination, the body 31 of the second element 30 is mounted within the space provided by the C-shaped body 21 of the first element 20. In this instance, the pressing board 25 of the first element 20 presses against the pressing board 34 of the second element 30, and the protruded shaft 33 of the second element 30 forms a pressing condition (as shown in Fig. 2), such that a inter-restricting state is formed between the first and second elements 20 and 30.

As shown in Figs. 2, 3 and 4, when any position of the cap 12 is pressed, due to the inter-restricting action of the first and second element 20 and 30, the vertical movement of the cap 12 is a stable and well-balanced movement. That is, when the cap 12 is pressed